

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JnanaSangama”, Belgaum -590014, Karnataka.



LAB REPORT on

Object Oriented Java Programming

Submitted by

Kalyan.K(1BM21CS085)

in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING



B.M.S. COLLEGE OF ENGINEERING

(Autonomous Institution under VTU)

BENGALURU-560019

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B. M. S. College of Engineering,
Bull Temple Road, Bangalore 560019
(Affiliated To Visvesvaraya Technological University, Belgaum)
Department of Computer Science and Engineering



CERTIFICATE

This is to certify that the Lab work entitled “**Object Oriented Java Programming**” carried out by **kalyan.k(1BM21CS085)**, who is bonifide student of **B. M. S. College of Engineering**. It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year2022-23. The Lab report has been approved as it satisfies the academic requirements in respect of Data Structures Lab - **(21CS3PCOOJ) work** prescribed for the said degree.

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Course Outcome

CO1	Apply the knowledge of Java concepts to find the solution for a given problem.
CO2	Analyse the given Java application for correctness/functionalities.
CO3	Develop Java programs / applications for a given requirement.
CO4	Conduct practical experiments for demonstrating features of Java.

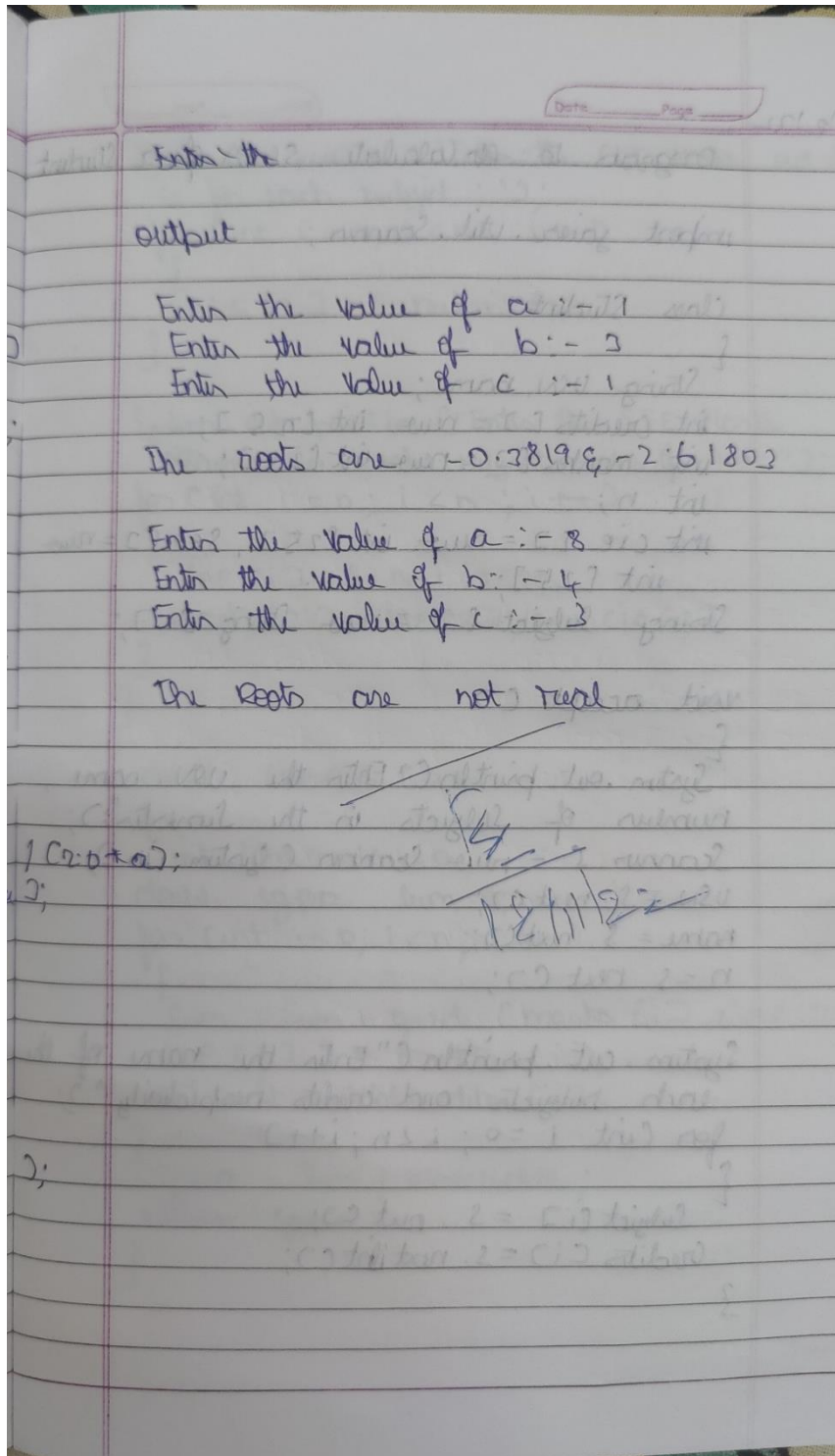
PROGRAM 1

- 1) Develop a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.**

Quadratic Equation

```
import java.util.Scanner;

public class QuadraticEquationExample {
    public static void main (String[] Strings) {
        Scanner input = new Scanner (System.in);
        System.out.println ("Enter the value of a:");
        double a = input.next Double ();
        System.out.println ("Enter the value of b:");
        double b = input.next Double ();
        System.out.println ("Enter the value of c:");
        double c = input.next Double ();
        double d = b * b - 4.0 * a * c;
        if (d > 0.0) {
            double r1 = (-b + Math.Pow (d, 0.5)) / (2.0 * a);
            double r2 = (-b - Math.Pow (d, 0.5)) / (2.0 * a);
            System.out.println ("The roots are " + r1
                                + " and " + r2);
        }
        else if (d == 0.0) {
            double r1 = -b / (2.0 * a);
            System.out.println ("The roots is " + r1);
        }
        else {
            System.out.println ("Roots are not real");
        }
    }
}
```



OUTPUT:

```
Command Prompt
Microsoft Windows [Version 10.0.19044.2364]
(c) Microsoft Corporation. All rights reserved.

C:\Users\samri> cd C:\Users\samri\Desktop\java lab

C:\Users\samri\Desktop\java lab> javac sample.java
sample.java:3: error: class quadratic equations is public, should be declared in a file named quadratic equations.java
public class quadratic equations {
      ^
1 error

C:\Users\samri\Desktop\java lab> javac sample.java

C:\Users\samri\Desktop\java lab> java quadratic equations
Enter the value of a
34
Enter the value of b
56
Enter the value of c
5
The roots are -0.09473460627271374 and -1.552324217256698

C:\Users\samri\Desktop\java lab>
```

PROGRAM 2

Develop a Java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

12/6/22

Program to Calculate SGPA of a Student

```
import java.util.Scanner;

class Student
{
    String USN, name;
    int credits[] = new int [25];
    int marks[] = new int [25];
    int n;
    int cie[] = new int [25], See[] = new
        int [25];
    String Subject[] = new String [10];

    void accept()
    {
        System.out.println("Enter the USN, name,
        number of Subjects in the Semester:");
        Scanner s = new Scanner (System.in);
        USN = s.next();
        name = s.next();
        n = s.nextInt();

        System.out.println("Enter the name of the
        each subjects and credits respectively");
        for (int i = 0; i < n; i++)
        {
            Subject[i] = s.next();
            credits[i] = s.nextInt();
        }
    }
}
```



```

System.out.println("Enter the CEE Marks out of 100:");
for (int i = 0; i < n; i++)
{
    cie[i] = S.nextInt();
}

```

```

System.out.println("Enter the SEE Marks obtained in each subject out of 100:");
for (int i = 0; i < n; i++)
{
    see[i] = S.nextInt();
    marks[i] = (see[i] / 2 + cie[i]);
}
}

```

```

double calculate()
{
    int totalCredit = 0;
    double sgpa, sum = 0;
    for (int i = 0; i < n; i++)
    {
        sum = sum + grade(marks[i], cie[i], see[i]) * credits[i];
        totalCredit = totalCredits[i];
    }
    sgpa = sum / totalCredits;
    return sgpa;
}

```

Date _____ Page _____

Enter the CIE Marks out of 50 for each

25
40
45

Enter the SEE Marks obtained in each subject out of 100

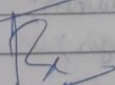
60
50
90

USN: 18M21CS085

Name: - Kalyan

Subject	Credits	Marks	Grade	points
Maths	4	65	7	
DBMS	4	65	7	
DST	2	90	10	

SGPA = 7.8181818


 02/12/22

OUTPUT

```
Command Prompt
public class Sgpa {
    ^
1 error

C:\Users\samri\Desktop\java lab>javac sample.java

C:\Users\samri\Desktop\java lab>java Sgpa
Enter the Details of the student

Enter the usn of the student
345
Enter the Name of the Student
samrith
Enter the Marks of the 1 st Subject
98
Enter the Marks of the 2 st Subject
99
Enter the Marks of the 3 st Subject
78
Enter the Marks of the 4 st Subject
90
Enter the Marks of the 5 st Subject
97
The Name of the Student : samrith
The Usn of the Student : 345
The SGPA of the Student : 8.0

C:\Users\samri\Desktop\java lab>
C:\Users\samri\Desktop\java lab>
C:\Users\samri\Desktop\java lab>
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C:\Users\samri\Desktop\java lab>
C:\Users\samri\Desktop\java lab>

Activate Windows
Go to Settings to activate Windows.
```

PROGRAM 3

Create a class Book which contains four members: name, author, price, num_pages. Include a constructor to set the values for the members.

Include methods to set and get the details of the objects. Include a toString() method that could display the complete details of the book.

Develop a Java program to create n book objects

```
book program
import java.util.*
class Book {
    Scanner sc = new Scanner(System.in);
    String name, author;
    int price, num_pages;
    Book() {
    }
    Book(String name, String author, int price, int num_pages) {
        this.name = name;
        this.author = author;
        this.price = price;
        this.num_pages = num_pages;
    }
    void getData() {
        System.out.println("Enter the name of book:");
        name = sc.nextLine();
        System.out.println("Enter the name of author:");
        author = sc.nextLine();
        System.out.println("Enter the price:");
        price = sc.nextInt();
        System.out.println("Enter the number of pages:");
        num_pages = sc.nextInt();
    }
    public String toString() {
```

Date: _____ Page: _____

Output

Enter number of books

Enter the details of 1 book

Enter the name of book

Friend

Enter the name of author

gaur

Enter the price

500

Enter the number of pages

300

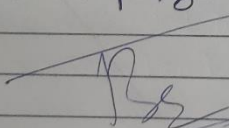
Details of book

Name :- Friend

Author :- gaur

Price :- 500

Number of pages :- 300



09/12/22

OUTPUT:

```
Command Prompt
at java.base/java.util.Scanner.next(Scanner.java:1598)
at java.base/java.util.Scanner.nextDouble(Scanner.java:2569)
at Bookdetails.main(sample.java:59)

C:\Users\samri\Desktop\java lab>java Bookdetails
Enter the no of Books
2
Enter the Details of the1th Book
Enter the Title of the Book
CodedTriangles
Enter the Author of the Book
Sreedharpriyan
Enter the Price of the Book
345
Enter the Pages of the Book
190
Enter the Details of the2th Book
Enter the Title of the Book
Annakaranina
Enter the Author of the Book
LeoToslttoy
Enter the Price of the Book
567
Enter the Pages of the Book
45
Title Author Price Numberofpages
CodedTriangles Sreedharpriyan 345.0 190
Annakaranina LeoToslttoy 567.0 45

C:\Users\samri\Desktop\java lab>
```

Activate Windows
Go to Settings to activate Windows.

PROGRAM 4

Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea() that prints the area of the given shape.

The image shows a handwritten Java program on a notebook spread. The left page is titled 'Program 3' and the right page is titled 'Program 4'. The code is written in a cursive, handwritten style.

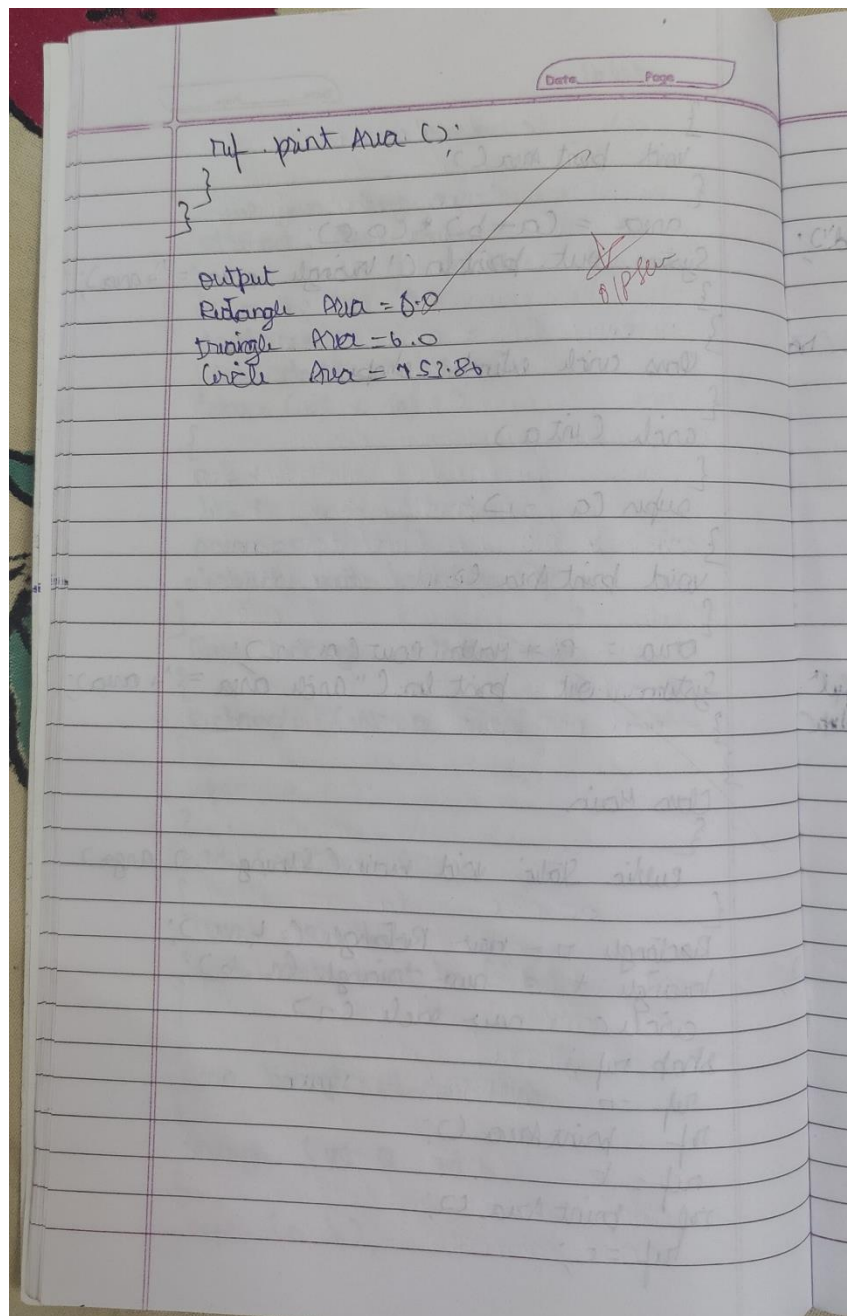
```
import java.lang.*;
abstract class Shape
{
    int a, b;
    double area;
    final double Pi = 3.14;
    Shape (int x, int y)
    {
        a = x;
        b = y;
        area = 0;
    }
    abstract void printArea();
}

class Rectangle extends Shape
{
    Rectangle (int a, int b)
    {
        super (a, b);
    }
    void printArea()
    {
        area = a * b;
        System.out.println ("Rectangle Area = " + area);
    }
}

class Triangle extends Shape
{
    Triangle (int a, int b)
    {
        super (a, b);
    }
    void printArea()
    {
        area = (a * b) * (0.5);
        System.out.println ("Triangle Area = " + area);
    }
}

class Circle extends Shape
{
    Circle (int a)
    {
        super (a, -1);
    }
    void printArea()
    {
        area = Pi * Math.pow (a, 2);
        System.out.println ("Circle Area = " + area);
    }
}

class Main
{
    public static void main (String [] args)
    {
        Rectangle r = new Rectangle (4, 2);
        Triangle t = new Triangle (2, 6);
        Circle c = new Circle (7);
        Shape ref;
        ref = r;
        ref.printArea();
        ref = t;
        ref.printArea();
        ref = c;
        ref.printArea();
    }
}
```



OUTPUT

```
Command Prompt
Annakaranina  LeoTosltov  567.0  45

C:\Users\samri\Desktop\java lab>javac sample.java
C:\Users\samri\Desktop\java lab>java Area
choose to calculate area
1.Rectangle
2.Triangle
3.Circle
Enter Your Choice
2
Enter the value of length
54
Enter the value of breath
4
The area of the Rectangle is :216

C:\Users\samri\Desktop\java lab>java Area
choose to calculate area
1.Rectangle
2.Triangle
3.Circle
Enter Your Choice
1
Enter the value of length
34
Enter the value of height
56
The area of the Triangle is :952.0

C:\Users\samri\Desktop\java lab>java Area
choose to calculate area
1.Rectangle
2.Triangle
3.Circle
Enter Your Choice
3
Enter the value of Radius
56
The area of the Circle is :9847.04

C:\Users\samri\Desktop\java lab>
```

Activate Windows
Go to Settings to activate Windows.

PROGRAM 5

Develop a Java program to create a class Bank that maintains two kinds of account for its customers, one called savings account and the other current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class Account that stores customer name, account number and type of account. From this derive the classes Cur-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the

following tasks: a) Accept deposit from customer and update the balance.
b) Display the balance. c) Compute and deposit interest d) Permit withdrawal and update the balance Check for the minimum balance, impose penalty if necessary and update the balance.

Date 30/11/22

Bank Program

```

import java.util.Scanner;

class account {
    String name;
    int account_num;
    String acc_type;
}

class sav_acc extends account {
    double balance;

    sav_acc(String n, int ac, String ac_type,
            Double bal) {
        name = n;
        account_num = ac;
        acc_type = ac_type;
        balance = bal;
    }

    Scanner sc = new Scanner(System.in);

    void deposit(int val) {
        balance += val;
    }

    void display_bal() {
        System.out.println("Balance is: " + balance);
    }
}

```

```

case 3
    a. deposit - interest (C)
    break;
case 4
    System.out.println("Enter the value
        to withdraw:");
    int withdraw = sc.nextInt();
    ac.withdrawal(withdraw);
    break;
case 5
    a. check - min
    break;
case 6
    System.out.println("Enter choice:");
    break;
default
    System.out.println("Enter a valid choice.");
    break;
}
}

Output
Enter your name & Account number, account
type, balance
Withdrawal
23799
Savings
1000

```

```

1. deposit
2. display balance
3. compute & deposit interest
4. withdrawal
5. check for min balance
6. exit

Enter the value for deposit
1

1. deposit
2. display balance
3. compute & deposit interest
4. withdrawal
5. check for min balance
6. exit

Balance is : 1001

Enter your choice
3
Enter time period
1
Enter your choice
2
Balance is : 10.51.09

Enter your choice
4

```

Date _____ Page _____

12

Withdrawal is successful.

new balance: 1036

enter choice

5

balance higher than min balance

displays at various art museums

Respect

Lactuca scariola 8/12/77

Locomotor

Order for my father

1001 : 2 months

Enter your name

haird craft outro

input may not

20.12.2017 di martedì

1. How many also

OUTPUT:

```
Command Prompt
Compound interest is 1.945779834454954E72
Enter the amount to be withdrawn
56
Withdrawn : 56.0
Current balance : 4011.0

C:\Users\samri\Desktop\java lab>javac sample.java
sample.java:2: error: class Exception is public, should be declared in a file named Exception.java
public class Exception {
      ^
1 error

C:\Users\samri\Desktop\java lab>javac sample.java

C:\Users\samri\Desktop\java lab>java Exception
Enter the 1st value
23
Enter the 2nd value
7
The first value is 23
The Second value is 7
Result of division is 3.0
Finished the Execution

C:\Users\samri\Desktop\java lab>java Exception
Enter the 1st value
1a
Enter the 2nd value
5
NumberFormatException: Invalid input string
Finished the Execution

C:\Users\samri\Desktop\java lab>java Exception
Enter the 1st value
56
Enter the 2nd value
0
The first value is 56
The Second value is 0
We failed ot divide.Reason is..
java.lang.ArithmeticException: / by zero
Finished the Execution

C:\Users\samri\Desktop\java lab>
```

Activate Windows
Go to Settings to activate Windows.

PROGRAM 6

Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked.

If Num1 or Num2 were not an integer, the program would throw a `NumberFormatException`. If Num2 were Zero, the program would throw an `ArithmeticException`. Display the exception in a message dialog box.

Program 6

```

public class Exception {
    public static void main (System.in) {
        Scanner sc = new Scanner (System.in);
        System.out.println ("Enter the 1st value");
        String s1 = sc.next ();
        System.out.println ("Enter the 2nd value");
        String s2 = sc.next ();

        int a = Integer.parseInt (s1);
        int b = Integer.parseInt (s2);

        try {
            double c = a / b;

            System.out.println ("The first value is " + a);
            System.out.println ("The second value is " + b);

            try {
                double c = a / b;
                System.out.println ("Result of division is " + c);
            } catch (ArithmeticException e) {
                System.out.println ("Error: Division by zero");
            }
        } catch (NumberFormatException e) {
            System.out.println ("Error: Invalid input");
        }
    }
}

```

Date _____ Page _____

System.out.println("Number form
- out Exception: Invalid input
along ");

33

~~Here~~ Enters the 1st value
45

The first value is 45
for second value is 6

24

19 - part. 2. 1914

SS all trans. long. methyl

input string 123 - output

with Charles Forman Esq

topfer bildent: redox: 100

1. Introduction

23

MS

27. Zichkov, Franz 1897

OUTPUT:

```
Command Prompt
Compound interest is 1.945779834454954E72
Enter the amount to be withdrawn
56
Withdrawn : 56.0
Current balance : 4011.0

C:\Users\samri\Desktop\java lab>javac sample.java
sample.java:2: error: class Exception is public, should be declared in a file named Exception.java
public class Exception {
      ^
1 error

C:\Users\samri\Desktop\java lab>javac sample.java

C:\Users\samri\Desktop\java lab>java Exception
Enter the 1st value
23
Enter the 2nd value
7
The first value is 23
The Second value is 7
Result of division is 3.0
Finished the Execution

C:\Users\samri\Desktop\java lab>java Exception
Enter the 1st value
1a
Enter the 2nd value
5
NumberFormatException: Invalid input string
Finished the Execution

C:\Users\samri\Desktop\java lab>java Exception
Enter the 1st value
56
Enter the 2nd value
0
The first value is 56
The Second value is 0
We failed ot divide.Reason is..
java.lang.ArithmeticException: / by zero
Finished the Execution

C:\Users\samri\Desktop\java lab>
```

Activate Windows
Go to Settings to activate Windows.

PROGRAM 7

Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class called “Father” and derived class called “Son” which extends the base class. In Father class, implement a constructor which takes the age and throws the exception WrongAge() when the input age<0. In Son class, implement a constructor that takes both father and son’s age and throws an exception if son’s age is >=father’s age.

Date: 13/11/23

Program 7

```
import java.util.*;

class FatherAgeException extends Exception {
    public String toString() {
        return ("Father's age is less than 0");
    }
}

class SonAgeException extends Exception {
    int a;

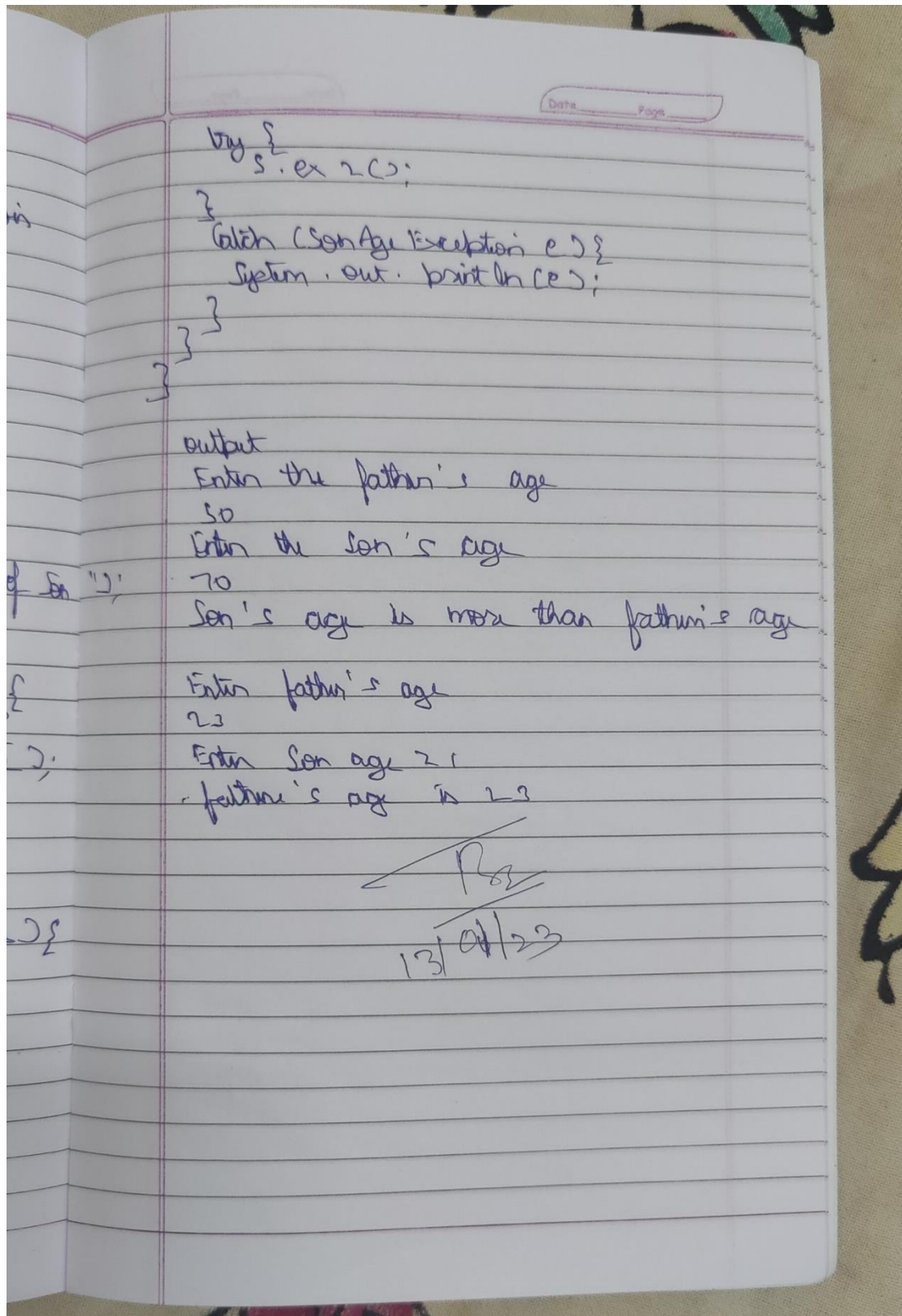
    SonAgeException(int age) {
        a = age;
    }

    public String toString() {
        if (a < 0)
            return ("Son's age is less than 0");
        else
            return ("Son's age is more than father's age");
    }
}

class Father {
    int age;

    Scanner in = new Scanner(System.in);

    Father() {
        System.out.println("Enter the father's age:");
    }
}
```



OUTPUT:

```
Command Prompt
Exception1.java:21: error: constructor Object in class Object cannot be applied to given types;
super(agef);
^
  required: no arguments
  found:    int
  reason: actual and formal argument lists differ in length
1 error

C:\Users\sammi\Desktop\java lab>javac Exception1.java
Exception1.java:21: error: constructor Object in class Object cannot be applied to given types;
super(agef);
^
  required: no arguments
  found:    int
  reason: actual and formal argument lists differ in length
1 error

C:\Users\sammi\Desktop\java lab>javac Exception1.java

C:\Users\sammi\Desktop\java lab>java Exception1
Enter the Father's Age
45
Enter the Son's Age
12
Father age:45
Son's age:12

C:\Users\sammi\Desktop\java lab>java Exception1
Enter the Father's Age
0
Enter the Son's Age
23
Exception in thread "main" Wrong age! Please enter the Right age
    at Exception1.main(Exception1.java:39)

C:\Users\sammi\Desktop\java lab>java Exception1
Enter the Father's Age
6
Enter the Son's Age
78
Exception in thread "main" Wrong age! Please enter the Right age
    at Exception1.main(Exception1.java:39)

C:\Users\sammi\Desktop\java lab>
```

Activate Windows
Go to Settings to activate Windows.

PROGRAM 8

Write a program which creates two threads, one thread displaying “BMS College of Engineering” once every ten seconds and another displaying “CSE” once every two seconds

Prag 9

Date _____ Page _____

```
class SampleThread implements Runnable {
    String message, name;

    Thread t;

    SampleThread (String msg, String
    name) {
        this.message = msg;
        this.name = name;
    }

    public void run() {
        try {
            for (int i = 5; i > 0; i--) {
                if (t.getName().equals("Thread 1")) {
                    System.out.println (message);
                    Thread.sleep (10000);
                }
            }
        }
    }
}
```


3. ... hand

System.out.println("Thread was interrupted.");

Class Display Thread also

Sample thread S1 = new ^{sample} thread C1

Sample Thread 1 = Sample Thread
("CSF", Thread 2)

2. (Cocoon) d/c. host

Subject

RM S College of Engineering

C E

CSE

CSE

CSE

CSE

Existing thread: Thread 2

I was

BMS college of Engineering

PMS College of Engineering
RMC College of Engineering

RMS college of Engineering

thread

sum (2)

Exiting Thread: Thread.

$\arg(z) = \arg(1)$

 λ_f

✓

22

OUTPUT:



```
Command Prompt
C:\Users\Admin\Desktop\18M21CS105>javac displaythreads.java
C:\Users\Admin\Desktop\18M21CS105>java DisplayThread
MS COLLEGE OF ENGINEERING
SE
SE
SE
SE
SE
MS COLLEGE OF ENGINEERING
Exiting thread:Thread2
MS COLLEGE OF ENGINEERING
MS COLLEGE OF ENGINEERING
MS COLLEGE OF ENGINEERING
Exiting thread:Thread1
C:\Users\Admin\Desktop\18M21CS105>
```